

# Preliminary Data on the Status of Oxidative Stress during Low-Risk Work

Anna Górka\*

Department of Biotechnology, University of Rzeszow, Pigoia 1, 35-310 Rzeszow, Poland

## Introduction

Reactive oxygen species, which cause oxidative stress, are linked to pregnancy and delivery. The progression of labour and the development of the foetus may both be negatively impacted by oxidative stress. Monitoring the oxidative stress indicators can be utilised to determine the newborn's health and the likelihood of pregnancy-related health problems. As a result, understanding the function of oxidative stress in the pathophysiology of miscarriages and newborn health conditions begins with an investigation of oxidative stress during the physiological course of labour. The goal of the study was to evaluate the oxidative stress on mother-child pairs in the umbilical cord blood and venous blood during physiological labour. To contribute the mother's venous blood during the first stage of labor and the venous umbilical cord blood following the birth of the child, 128 mother-child pairs were enlisted. In venous blood plasma and umbilical cord blood, the total antioxidant status with cofactors (Mn) and the activity of glutathione peroxidase were examined. Compared to neonatal umbilical cord blood, mother blood plasma had a substantially lower value and Zn content. However, compared to newborns, the activity and concentration of were much higher in the blood of moms. Both the mother's blood plasma and the neonates' umbilical cord blood had comparable Mn concentrations. According to our research, umbilical cord blood has greater amounts of antioxidant enzyme and overall antioxidant potential.

## Description

Oxidative stress may accompany physiological changes related to pregnancy that are necessary to satisfy the needs of the growing foetus and the mother's health needs. Fatty acids are used as the body's main energy source and metabolism speeds up in females, who also consume more oxygen. Large quantities of energy are needed to adapt the mother's body to the higher metabolic demands of a growing uterus, expanding placenta, and growing foetus. Increasing oxygen levels in the blood may encourage the production of free oxygen radicals and, as a result, lipid peroxidation. Reactive oxygen species are oxygen-containing molecules with unpaired electrons and free radicals that serve as oxidising agents by removing an electron from oxygen. The growing placenta's abundance of mitochondria also drives the synthesis of these molecules. to the health system are thought to be the causes of this health inequality. These factors can be organizational or behavioral [1,2].

oxygen to other molecules or an electron As a result of lipid peroxidation, protein alterations, DNA damage, and changed membrane ion channel activity, low concentrations of perform physiological activities, whereas high amounts of intra- and extracellular may cause permanent cell damage, necrosis, and

apoptosis. The body's defence systems control the oxidative stress that develops during pregnancy, maintaining a balance between the creation of free radicals and the antioxidant capacity, preserving the course of the pregnancy and the growth of the foetus. Hypoxia and oxidative stress during the first trimester of pregnancy are physiological states brought on by the mother's arterial circulation filling the placenta's interstitial spaces. Due to the increased oxygen pressure caused by this state, ROS and peroxides are produced. Due to the second trimester's rapid metabolism and high oxygen and fatty acid intake, ROS are produced at this time. The low flow, high blood resistance system switches over to a high flow, low resistance system at this time. The release of free fatty acids, insulin resistance, and fat catabolism all rise during the third trimester, which also sees a rise in the generation of hydrogen peroxide.

Additionally, higher levels of lipid peroxidation are linked to higher levels of triglycerides, total cholesterol, cholesterol, and oxidative stress indicators Nitric oxide synthase activity in the uterus declines during the end of pregnancy. The uteroplacental blood flow is decreased during labour due to the uterine muscle's contractile activity. The uterine muscle is first activated, and oxytocin and prostaglandin synthesis are boosted. Vascular resistance lowers and placental vessel diameter rises during this period. This ensures blood circulation, guards the foetus against hypoxia, and prevents decreased uteroplacental blood flow after delivery [3].

Reactive oxygen species production is known to rise during pregnancy and delivery, which may lead to an imbalance between pro- and antioxidants. Total antioxidant status, which assesses the capacity to fend off harm from reactive oxygen species and their derivatives, is the factor defining the activity of the non-specific pool of antioxidants. TAS levels in the first trimester of pregnancy in pregnant women are substantially lower than in non-pregnant women, according to studies. The dynamic of changes throughout pregnancy was also discovered in the second and third trimesters; the total antioxidant capacity of plasma rises, reaching levels comparable to those seen in non-pregnant women in the final week of pregnancy. This parameter rises to eight weeks after delivery following childbirth. Maternal blood's mean total antioxidant status values were substantially lower than those of umbilical cord blood, which may indicate that the antioxidant reserve has been depleted as a result of the system's diminished effectiveness and increased generation of reactive oxygen species. The observed discrepancies between maternal and child levels may be explained by the increase in foetal antioxidant reserves upon full-term birth. Other researchers who evaluated that adversely correlate with noted an intriguing finding. Compared to maternal blood, the umbilical cord blood had a lower concentration by approximately [4].

A vast variety of antioxidants in human bodies work to repair damaged molecules, limits the activity of free radicals, or prevent their creation, shielding the body from their damaging effects. Manganese, copper, and zinc metal ions are involved in hormone production, regulation, and serving as cofactors for antioxidant enzymes Nuclear factor kappa B is released during birthing to balance oxidative stress and control the inflammatory response in the placental membrane. Different patterns of the oxidative response and modifications in oxidative and antioxidant indicators may result from the imbalance of metal ions between the mother and the foetus. In our investigation, the mean manganese concentrations in umbilical cord blood and venous blood plasma were comparable. Tasker et al. [5].

\*Address for Correspondence: Anna Górka, Department of Biotechnology, University of Rzeszow, Pigoia 1, 35-310 Rzeszow, Poland, E-mail: annagorka55@gmail.com

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## Conclusion

At a national level in France, our study has revealed disparities in the care pathways for breast cancer among women with SMI and controls without SMI. A crucial first step toward taking action is providing data on care disparities experienced by this vulnerable population, which has been overlooked in health-services research focusing on care inequities. With the knowledge that the complexity associated with SMI necessitates special consideration and that providing increased quality of care for this population group has the potential to make up for some of the structural health inequities they face throughout their life, additional research on causal mechanisms will help inform the development of system-level multifaceted interventions.

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